Assessment Schedule

Statistics and Modelling: Solve straightforward problems involving probability (90643)

Evidence Statement

Question	Achievement	Achievement with Merit	Achievement with Excellence	Judgement	Sufficiency
ONE (a)	P(fruit in lunch) = 0.7031			CRO Or equivalent.	1(a) for Achievement.
(b)		P(bought / fruit in lunch) = 0.2473		CRO Or equivalent.	1(b) for Merit.
(c)	$P(\text{juice}) = 0.72 \times 0.56 + 0.28 \times 0.12$ $= 0.4368$	$P(\text{fruit} / \text{juice}) = \frac{P(\text{fruit} \cap \text{juice})}{P(\text{juice})} = \frac{0.72 \times 0.56}{0.72 \times 0.56 + 0.28 \times 0.12} = 0.9231$	$P(\text{fruit} \cap \text{bought} / \text{juice}) = \frac{0.72 \times 0.56 \times 0.6}{0.4368} = \frac{0.24192}{0.4368} = 0.5538$ OR $P(\text{fruit} \cap \text{bought} / \text{juice}) = 0.6 \times 0.9231 = 0.5538$	Or equivalent.	1(c) for Excellence.

Question	Achievement	Achievement with Merit	Achievement with Excellence	Judgement	Sufficiency
TWO (a)	P(filled roll and sushi) $= \frac{6}{28} = \frac{3}{14} = 0.2143$			CRO Or equivalent.	2(a) for Achievement.
(b)		P(at least 11 bought sushi) $= \frac{{}^{18}C_{11} \times {}^{10}C_1 + {}^{18}C_{12} \times {}^{10}C_0}{{}^{28}C_{12}}$ $= 0.011$		Or equivalent.	2(b) for Merit.
(c)			P(both sushi) = 0.8 $\frac{m}{10} \times \frac{m-1}{9} = 0.8$ $m^2 - m - 72 = 0$ $m = 9, -8$ $m = 9$ OR $\frac{{}^{m}\mathrm{C}_2 \times {}^{10-m}\mathrm{C}_0}{{}^{10}\mathrm{C}_2} = 0.8$ $\frac{m!}{(m-2)! \times 2!} \div 45 = 0.8$ $m(m-2) = 72$ $m^2 - m - 72 = 0$ $m = 9, -8$ $m = 9$	Need to see justification of why $m = 9$. Watch for RAWW: $\frac{m}{10} \times \frac{m}{10} = 0.8$ $m^2 = 80$ $m = 9$	2(c) for Excellence.

<table>
<tr><th>Question</th><th>Achievement</th><th>Achievement with Merit</th><th>Achievement with Excellence</th><th>Judgement</th><th>Sufficiency</th></tr>
<tr><td>THREE
(a)</td><td>P(car ∩ buys lunch) = 0.0864

P(car) × P(buys lunch)
= 0.24 × 0.32
= 0.0768
≠ P(car ∩ buys lunch)

So the two events are NOT independent.</td><td></td><td></td><td>Need both the answer “NOT independent” AND valid numerical justification.</td><td>3(a) for Achievement.</td></tr>
<tr><td>(b)</td><td></td><td>Let M be amount saved per day

<table><tr><td>m</td><td>0</td><td>0.5</td><td>1</td><td>2</td></tr><tr><td>P(M)</td><td>0.5264</td><td>0.2336</td><td>0.1536</td><td>0.0864</td></tr></table></td><td>E[M] = 0.4432
5 × 0.4432 = 2.216
So over 5 days would expect to save $2.22.</td><td>Allow variations due to rounding.

Ignore rounding in final answer.</td><td>3(b) Probability distribution for Merit.

3(b) Probability distribution and 5 day saving for Excellence.</td></tr>
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Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Solve straightforward problems involving probability.	Solve probability problems.	Apply probability theory.
3 **A** *OR* 1 **A** + 1 **M**	2 **M**	2 **E**

The following Mathematics-specific marking conventions may also have been used when marking this paper:

- Errors are circled.
- Omissions are indicated by a caret (^).
- **NS** may have been used when there was not sufficient evidence to award a grade.
- **CON** may have been used to indicate 'consistency' where an answer is obtained using a prior, but incorrect answer and **NC** if the answer is not consistent with wrong working.
- **CAO** is used when the 'correct answer only' is given and the assessment schedule indicates that more evidence was required.
- # may have been used when a correct answer is obtained but then further (unnecessary) working results in an incorrect final answer being offered.
- **RAWW** indicates right answer, wrong working.
- **R** for 'rounding error' and **PR** for 'premature rounding' resulting in a significant round-off error in the answer (if the question required evidence for rounding).
- **U** for incorrect or omitted units (if the question required evidence for units).